

A

**UNITED STATES PATENT AND TRADEMARK OFFICE**

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/607,219	06/30/2000	Atsushi Kanda	15.18/5053	8200

24033 7590 09/24/2003

KONRAD RAYNES VICTOR & MANN, LLP
315 SOUTH BEVERLY DRIVE
SUITE 210
BEVERLY HILLS, CA 90212

EXAMINER

QUACH, TUAN N

ART UNIT	PAPER NUMBER
----------	--------------

2814

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/607,219

Applicant(s)

KANDA, ATSUSHI

Examiner

Tuan Quach

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 48, 49, 52-90 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 48, 49, 52-90 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This application contains claims directed to the following patentably distinct species of the claimed invention:

1. The species of the claimed invention in claims 83-90 regarding a method for fabricating a semiconductor device comprising forming a pad, forming a protective insulating region comprising first and second insulating layers, the first insulating layer being in direct contact with the pad and the second insulating layer being in direct contact with the pad and the second insulating layer being in direct with the first insulation layer, the second insulating layer comprising silicon nitride; forming a mask layer, dry etching the surface of the second insulating layer to form an opening extending through the second insulating layer and the first insulating layer wherein the dry etching includes etching the second insulation layer to define a tapered shape and etching the first insulation layer to define a tapered shaped and wherein the dry etching is controlled so that the first insulation includes an upper surface portion exposed to the opening, the upper surface portion extending between the upper end of a side surface of the first insulation layer and a lower end of a side surface of the second insulation layer, wherein the side surface of the first insulation layer and the side surface of the second insulation layer are both exposed to the opening.

2. The species of the claimed invention in claims 78-82 regarding a method of fabricating a semiconductor device comprising forming a pad with a predetermined pattern on an insulating layer forming a protective insulating layer on a surface of the

Art Unit: 2814

pad, forming a mask layer in direct contact with a surface of the protective layer, dry etching through the protective insulating layer to form an opening extending through the protective insulating layer so that the protective layer includes a side surface surrounding the opening, after the dry etching, removing the mask layer, and after removing the mask layer, heating the device at a temperature in the range of 350 °C – 450°C.

3. The species of the claimed invention in claims 68-77 regarding a method of fabricating a semiconductor device comprising forming a pad with a predetermined pattern, forming a protective insulating layer on a surface of the pad, forming a mask in direct contact with a surface of the protective insulating layer, dry etching through the protective insulating layer using an etchant comprising CF₄ to form an opening extending through the insulating layer so that the insulating layer includes a side surface surrounding the opening being tapered so that the opening of the protective insulation layer at the pad surface is smaller than the opening of the protective insulation layer a distance away from the pad surface.

4. The species of the claimed invention in claims 64-67 regarding a method for forming bonding pad area using a dry etch process comprising forming a conducting pad in electrical contact with an electronic device, forming a protective insulation layer on a surface of the conducting pad, the protective insulation layer including at least first and second insulating layers wherein the first insulating layer and the second insulating layer are formed from materials having different compositions the first insulating layer comprising a silicon oxide layer, the second insulating layer comprising a silicon nitride

Art Unit: 2814

layer, the silicon oxide layer being formed on the conducting pad, the silicon nitride layer being formed in the silicon oxide layer, forming a mask in direct contact with the protective insulation layer and providing an opening in the mask, and dry etching through the surface of the protective insulation layer at the opening in the mask to form an aperture extending through the silicon nitride layer and the silicon oxide layer to the surface of the pad using CF_4 and O_2 as an etchant so that the silicon nitride layer includes a side surface surrounding the aperture, the silicon nitride side surface having a tapered shape with an angle in the range of 30° to 60° in relation to the surface of the conducting pad and the silicon oxide layer includes a side surface surrounding the aperture, the silicon oxide layer side surface includes a side surface surrounding the aperture, the silicon oxide layer side surface having a tapered shape with an angle in the range of 60° to 90° in relation to the surface of the conducting pad.

5. The species of the claimed invention in claims 48-49, 52-63 regarding a method of fabricating a semiconductor device comprising forming pad, forming protective insulating region on the pad including first and second insulating layers, the first insulating layer being in direct contact with the pad and the second insulating layer being in direct contact with the first insulation layer, the second insulating layer comprising silicon nitride, forming a mask layer on the protective insulating region in direct contact with a surface of the second insulating layer, dry etching through the surface of the second insulating layer and the first insulating layer to the pad, wherein an etchant comprising CF_4 and O_2 is used to form the opening extending through the

Art Unit: 2814

second insulation layer, and wherein at least a portion of the opening has a tapered shape.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Art Unit: 2814

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is 703-308-1096. The examiner can normally be reached on M - F from 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Wael Fahmy can be reached on (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318 (Before Final) and (703) 872-9319 (After Final).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Tuan Quach
Primary Examiner